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Criminal Law and Common Sense: An Essay on the Perils and Promise of Neuroscience

Stephen J. Morse

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CRIMINAL LAW AND COMMON SENSE: AN ESSAY ON THE PERILS AND PROMISE OF NEUROSCIENCE

STEPHEN J. MORSE*

I.	INTRODUCTION.....	39
II.	NEUROEXUBERANCE.....	42
III.	PHILOSOPHICAL FOUNDATIONS AND SPOCKIAN METHODOLOGY.....	44
IV.	THE LAW’S PSYCHOLOGY, CONCEPT OF THE PERSON, AND RESPONSIBILITY	49
V.	DANGEROUS DISTRACTIONS CONCERNING NEUROSCIENCE AND CRIMINAL RESPONSIBILITY	53
VI.	LOST IN TRANSLATION? LEGAL RELEVANCE AND THE NEED FOR TRANSLATION	57
VII.	THE PRESENT LIMITS OF NEUROSCIENCE AND ITS LEGAL IMPLICATIONS	59
VIII.	THE RADICAL NEUROCHALLENGE: ARE WE VICTIMS OF NEURONAL CIRCUMSTANCES?.....	66
IX.	THE CASE FOR CAUTIOUS NEUROLAW OPTIMISM	69
X.	CONCLUSION	72

I. INTRODUCTION

The criminal law—a beautiful, albeit sometimes ramshackle, institution devoted to blaming and punishing culpable agents—has been developing for well over half a millennium to help us live together. It is the product of an

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This Article distills, draws on, and extends the work I have been doing on law and neuroscience for two decades. Many of the arguments are familiar, but until there are conceptual or scientific breakthroughs—and none is on the horizon—this is my story and I’m sticking to it.

I am indebted to the readers and critics, who are too numerous to mention, who have helped me refine my positions. Michael Moore deserves special mention, however, for no one has taught me as much. I also thank Ed Greenlee, as always, for his superb, invaluable help.

immense number of judicial decisions and penal statutes, and it has stood the test of time as the product of human trial and error. We common lawyers like to think that it is impossible to produce an *ex ante* watertight criminal code. As is well known, the Model Penal Code, an enterprise produced by the best and the brightest, has been subjected to intense criticism, and even states that have been heavily influenced by it have made substantial changes. Instead, common lawyers believe that the bottom-up, “organic” methodology of the common-law process in interaction with penal codes will ultimately produce reasonably coherent and just, but not perfect, criminal law.

The criminal law is a thoroughly folk-psychological enterprise.¹ Doctrine and practice implicitly assume that human beings are agents, creatures who act intentionally for reasons, who can be guided by reasons, and who in adulthood are capable of sufficient rationality to ground full responsibility unless an excusing condition obtains. We all take this “standard picture” for granted because it is the foundation not just of law but of interpersonal relations generally, including how we explain ourselves to others and to ourselves.

The law’s concept of the person and responsibility has been under assault throughout the modern scientific era, but in the last few decades dazzling technological innovations and discoveries in some sciences, especially the new neuroscience and to a lesser extent genetics, have put unprecedented pressure on the standard picture. For example, in a 2002 editorial published in *The Economist*, the following warning was given: “Genetics may yet threaten privacy, kill autonomy, make society homogeneous and gut the concept of human nature. But neuroscience could do all of these things first.”² Consider the following statement from a widely noticed chapter by neuroscientists Joshua Greene of Harvard and Jonathan Cohen of Princeton, which I quote at length to give the full flavor of the claim being made:

[A]s more and more scientific facts come in, providing increasingly vivid illustrations of what the human mind is really like, more and more people will develop moral intuitions that are at odds with our current social practices

Neuroscience has a special role to play in this process for the following reason. As long as the mind remains a black box, there will always be a donkey on which to pin dualist and libertarian intuitions. . . . What neuroscience does, and will continue to do at an accelerated pace, is elucidate the “when”, “where” and “how” of the mechanical processes that cause behaviour. It is one thing to deny that human

1. I discuss the meaning of folk psychology more thoroughly in Part IV.

2. *The Ethics of Brain Science: Open Your Mind*, *ECONOMIST*, May 25, 2002, at 77, 77, www.economist.com/node/1143317/print [<http://perma.cc/3DKJ-9GAZ>].

decision-making is purely mechanical when your opponent offers only a general, philosophical argument. It is quite another to hold your ground when your opponent can make detailed predictions about how these mechanical processes work, complete with images of the brain structures involved and equations that describe their function.

. . . .

At some further point . . . , [p]eople may grow up completely used to the idea that every decision is a thoroughly mechanical process, the outcome of which is completely determined by the results of prior mechanical processes. What will such people think as they sit in their jury boxes? . . . Will jurors of the future wonder whether the defendant . . . *could have done otherwise*? Whether he really *deserves* to be punished . . . ? We submit that these questions, which seem so important today, will lose their grip in an age when the mechanical nature of human decision-making is fully appreciated. The law will continue to punish misdeeds, as it must for practical reasons, but the idea of distinguishing the truly, deeply guilty from those who are merely victims of neuronal circumstances will, we submit, seem pointless.³

This is not the familiar metaphysical claim that determinism is incompatible with responsibility, about which I will say more below.⁴ It is a far more radical claim that denies the conception of personhood and action that underlies not only criminal responsibility but the coherence of law as a normative institution. It thus completely conflicts with our common sense. As the eminent philosopher of mind and action, Jerry Fodor, has written:

[W]e have . . . no decisive reason to doubt that very many commonsense belief/desire explanations are—literally—true.

Which is just as well, because if commonsense intentional psychology really were to collapse, that would be, beyond comparison, the greatest intellectual catastrophe in the history of our species; if we're that wrong about the mind, then that's the wrongest we've ever been about anything. The collapse of the supernatural, for example, didn't compare; theism never came close to being as intimately involved in our thought and our practice . . . as belief/desire explanation is. Nothing except, perhaps, our commonsense physics—our intuitive commitment to a world of observer-independent, middle-sized

3. Joshua Greene & Jonathan Cohen, *For the Law, Neuroscience Changes Nothing and Everything*, in LAW AND THE BRAIN 207, 217–18 (Semir Zeki & Oliver Goodenough eds., 2006).

4. See ROBERT KANE, A CONTEMPORARY INTRODUCTION TO FREE WILL 23-31 (2005) (explaining incompatibilism). I return to the subject in Parts III and V below. For now, it is sufficient to note that there are good answers to this challenge.

objects—comes as near our cognitive core as intentional explanation does. We'll be in deep, deep trouble if we have to give it up.

I'm dubious . . . that we *can* give it up; that our intellects are so constituted that doing without it (. . . *really* doing without it; not just loose philosophical talk) is a biologically viable option. But be of good cheer; everything is going to be all right.⁵

The central thesis of this Article is that Fodor is correct and that our commonsense understanding of agency and responsibility and the legitimacy of criminal justice generally are not imperiled by contemporary discoveries in the various sciences, including neuroscience and genetics. These sciences will not revolutionize criminal law, at least not anytime soon, and at most they may make modest contributions to legal doctrine, practice, and policy.

I first address the criminal law's motivation and the motivation of some advocates to turn to science to solve the very hard normative problems that law addresses. The next part discusses how I think the law should respond to the metaphysical issues that underpin our concepts of action and responsibility. Then the Article considers the law's psychology and its concepts of the person and responsibility. Next, I describe the general relation of neuroscience to law, which I characterize as the issue of "translation." The following part canvasses various distractions, especially determinism and the notion that causation is *per se* an excusing condition, that have bedeviled clear thinking about the relation of scientific, causal accounts of behavior to responsibility. Next, I examine the limits of neurolaw and then consider why neuroscience does not pose a genuinely radical challenge to the law's concepts of the person and responsibility. The penultimate part makes a case for cautious optimism about the contribution that neuroscience may make to criminal law in the near and intermediate term. A brief conclusion follows. Throughout, common sense is my guiding star.

II. NEUROEXUBERANCE

Advances in neuroimaging since the early 1990s have been the source of the exuberance. Two in particular stand out: the discovery of functional magnetic resonance imaging (fMRI), which allows noninvasive measurement of neural functioning, and the availability of ever-higher-resolution scanners, known colloquially as "magnets" because they use powerful magnetic fields to collect the data that are ultimately expressed in the colorful brain images that appear in the scientific and popular media. Bedazzled by the technology and

5. JERRY A. FODOR, *PSYCHOSEMANTICS: THE PROBLEM OF MEANING IN THE PHILOSOPHY OF MIND* xii (1987).

the many impressive findings, however, too many legal scholars and advocates have made claims for the relevance of the new neuroscience to law that are unsupported by the data⁶ or that are conceptually confused.⁷ I have termed this tendency “brain overclaim syndrome (BOS)” and have recommended “cognitive jurotherapy (CJ)” as the appropriate therapy.⁸

Everyone understands that legal issues are normative, addressing how we should regulate our lives in a complex society. How do we live together? What are the duties we owe each other? For violations of those duties, when is the state justified in imposing the most afflictive—but sometimes justified—exercises of state power, criminal blame, and punishment?⁹ When should we do this, to whom, and how much?

Virtually every legal issue is contested—consider criminal responsibility, for example—and there is always room for debate about policy, doctrine, and adjudication. In a recent book, Professor Robin Feldman has argued that law lacks the courage forthrightly to address the difficult normative issues that it faces.¹⁰ The law therefore adopts what Feldman terms an “internalizing” and an “externalizing” strategy for using science to try to avoid the difficulties.¹¹ In the internalizing strategy, the law adopts scientific criteria as legal criteria. A futuristic example might be using neural criteria for criminal responsibility. In the externalizing strategy, the law turns to scientific or clinical experts to make the decision. An example would be using forensic clinicians to decide whether a criminal defendant is competent to stand trial and then simply rubberstamping the clinician’s opinion. Neither strategy is successful because each avoids facing the hard questions and impedes legal evolution and progress. Professor Feldman concludes, and I agree, that the law does not err by using science too little, as is commonly claimed. Rather, it errs by using it too much, because the law is insecure about its resources and capacities to do justice.¹²

A fascinating question is why so many enthusiasts seem to have extravagant

6. Stephen J. Morse, *Lost in Translation? An Essay on Law and Neuroscience*, in 13 LAW AND NEUROSCIENCE 529 (Michael Freeman ed., 2010).

7. See, e.g., MICHAEL S. PARDO & DENNIS PATTERSON, MINDS, BRAINS, AND LAW: THE CONCEPTUAL FOUNDATIONS OF LAW AND NEUROSCIENCE (2013); Michael S. Moore, *Libet’s Challenge(s) to Responsible Agency*, in CONSCIOUS WILL AND RESPONSIBILITY 207 (Walter Sinnott-Armstrong & Lynn Nadel eds., 2011).

8. Stephen J. Morse, *Brain Overclaim Redux*, 31 LAW & INEQ. 509 (2013); Stephen J. Morse, *Brain Overclaim Syndrome and Criminal Responsibility: A Diagnostic Note*, 3 OHIO ST. J. CRIM. L. 397 (2006).

9. See, e.g., *In re Winship*, 397 U.S. 358, 364 (1970) (holding that due process requires that every conviction be supported by proof beyond reasonable doubt as to every element of the crime).

10. ROBIN FELDMAN, THE ROLE OF SCIENCE IN LAW (2009).

11. *Id.* at 19–21, 37–39.

12. *Id.* at 199–200.

expectations about the contribution of neuroscience to law, especially criminal law. Here is my speculation about the source. Many people intensely dislike the concept and practice of retributive justice, thinking that they are prescientific and harsh. Their hope is that the new neuroscience will convince the law at last that determinism is true, no offender is genuinely responsible, and the only logical conclusion is that the law should adopt a consequentially based prediction/prevention system of social control guided by the knowledge of the neuroscientist-kings who will finally have supplanted the platonic philosopher-kings.¹³ Then, they believe, criminal justice will be kinder, fairer, and more rational. They do not recognize, however, that most of the draconian innovations in criminal law that have led to so much incarceration—such as recidivist enhancements, mandatory minimum sentences, and the crack/powder cocaine sentencing disparities—were all driven by consequential concerns for deterrence and incapacitation. Moreover, as C.S. Lewis recognized long ago, such a scheme is disrespectful and dehumanizing.¹⁴ Finally, there is nothing inherently harsh about retributivism. It is a theory of justice that may be applied toughly or tenderly.

On a more modest level, many advocates think that neuroscience may not revolutionize criminal justice, but neuroscience will demonstrate that many more offenders should be excused and do not deserve the harsh punishments imposed by the United States criminal justice system. Four decades ago, our criminal justice system would have been using psychodynamic psychology for the same purpose. More recently, genetics has been employed in a similar manner. The impulse, however, is clear: jettison desert, or at least mitigate, judgments of desert. As will be shown below, however, these advocates often adopt an untenable theory of mitigation or an excuse that quickly collapses into the nihilistic conclusion that no one is really criminally responsible.

III. PHILOSOPHICAL FOUNDATIONS AND SPOCKIAN METHODOLOGY

One is always “doing” metaphysics whether or not one is aware of it. About some legal issues, it scarcely matters, but about the types of issues that the new sciences address, such as the causation of action (the mind-body problem) and the criteria for responsibility (compatibilism vs. incompatibilism), metaphysical assumptions matter. The question is whether one must resolve or even defend one’s metaphysical and other philosophical foundations in these fraught areas. I think not. I make no claim for metaphysical or philosophical quietism because I believe that metaphysical questions are conceptually and

13. Greene & Cohen, *supra* note 3, are exemplars of this type of thinking. I will discuss the normative inertness of this position in Part VIII.

14. C.S. Lewis, *The Humanitarian Theory of Punishment*, 6 RES JUDICATAE 224 (1953).

practically important in many cases.¹⁵ I shall suggest, however, that, when philosophy is foundational and practically important, one's position must be acknowledged but need not be defended or, *a fortiori*, resolved.

Please do the following thought experiment. Imagine that you do a content analysis of high-level introductory texts in metaphysics or in any other area in philosophy, such as the philosophy of mind and action. The intrepid investigator will find, without exception, that each text will describe many different, often contradictory, approaches to the central questions. What is the relation of the potential truth of determinism to the possibility of "free will" and responsibility? Every text will discuss libertarianism, hard determinism, and compatibilism. Are there moral truths independent of our constructs and practices? Every text will discuss varieties of realism, antirealism, and everything in between. What is the relation of the brain to consciousness, mind, and action? Every text will present various forms of physicalism and the like. There will almost always be good arguments for and against the various positions, but none will have clearly dominated, although some, such as substance dualism, will be included largely for historical reasons. Moreover, it is a science fiction fantasy to believe that science will resolve the most fundamental problems that might in principle admit of empirical solutions, at least in the lifetimes of the readers of this Article. Consequently, all the contenders will be left standing. To paraphrase the noted metaphysician, Lewis Carroll, everyone has won (at least in his or her own eyes) and all must have prizes.

What is a poor, country lawyer-scholar supposed to do in such circumstances when trying to make normative arguments about doctrine, practice, and policy? One possibility is to master all the metaphysical arguments relevant to the question being addressed, take a position, and try to defend it against the counterarguments. This seems like a bootless enterprise, however, if one's training is not in metaphysics and if one is primarily interested in doctrine, practice, and policy. Arguing metaphysics, or other basic philosophical issues, is not the country lawyer-scholar's comparative advantage, and it will not lead to an uncontroversial position, even if one were to achieve sufficient mastery. Further, the history of the law suggests that country lawyers can "run the railroad" without even recognizing the foundational issues that are implicated. If philosophical understanding is not the goal, it is in large measure a distraction. So the original question remains: How should one proceed?

My current preferred approach is what I call "Spockian solutions," or what

15. See generally Charles L. Barzun, *Metaphysical Quietism and Functional Explanation in the Law*, 34 LAW & PHIL. 89 (2015) (arguing for metaphysical engagement).

to do until the doctors of metaphysics and science arrive to cure our metaphysical and empirical ills. By Spockian I do not mean the cold-bloodedly, rational Vulcan, Dr. Spock, of Star Trek fame. I refer to the even more famous pediatrician and author, Dr. Benjamin M. Spock (1903–1998), whose many editions of the influential child care manual, *Baby and Child Care*, guided parents over the shoals of child-rearing for many generations.¹⁶ At a time when it was more difficult to obtain medical attention for one's sick child, the book was replete with formulas for ameliorating the problem—be it fever, diarrhea, or any other of the common ills that beset children¹⁷—until the doctor came (doctors made house calls in the past) or until the parents and child could make it to the doctor.

In the spirit of Dr. Spock, my legal home remedy is to start with a normative position that is attractive at the non-metaphysical level of applied ethical, moral, political, and legal theory. If this position is consistent with a reasonable metaphysics that does not conflict with relatively uncontroversial, or at least plausible, empirical accounts about the world and with other reasonable philosophical theories, then one can proceed without defending the metaphysics, the empirics, and the other philosophical positions. Common sense should enter the analysis, too. Any position that violates common sense should meet the most demanding burden of persuasion. Once one's foundational position is adopted, however, the scholar does have the duty to avoid adopting normative positions that require inconsistent metaphysical or other foundational positions unless there is good reason why different metaphysics or foundations may be appropriate for different contexts.

This home remedy is intellectually defensible. A plausible basic position must be taken, which requires reasonable understanding. A critic might point out all the reasons that the chosen metaphysics or other philosophical foundation is questionable and, therefore, that the normative position adopted might seem unjustified. But a sophisticated metaphysician who adheres to the chosen metaphysics would have answers, and there would be no decisive arguments to refute the sophisticate. Trying to defend a metaphysics at the level of professional philosophy involves too much “inside baseball” analysis when one is trying to accomplish something else.

Now let me turn to examples of the home remedy that are relevant to the other topics this Article addresses. The basic questions that run through most are the relation of the brain (or body, or matter) to mind and action and the

16. BENJAMIN SPOCK, *BABY AND CHILD CARE* (4th ed. 1976). I cite an earlier edition because the following examples are drawn from it. The book is now in its ninth edition (with Robert Needlman).

17. *Id.* at 235-37 (diarrhea), 501-02 (high fever).

implications of the truth of determinism. I am a physicalist about the former. The brain enables the mind and action, but we have no idea *how*, despite all the astonishing advances in neuroscience and other disciplines.¹⁸ Indeed, the problem of consciousness may be insoluble,¹⁹ although perhaps progress can be made on mental states and actions. How do we know that the brain enables the mind and action? Well, if your brain is dead, you are dead, and to the best of our knowledge, you have no mental states and aren't doing much at all (although your heart and lungs may still be working if your brain stem is still alive).

Assuming that the brain does enable the mind and action, is the relation reductive or not? Is property dualism true? Can mental states cause changes in physical states, or does the exclusion principle require that causation can only run from the physical to the mental? At present, nonreductive physicalism is probably the dominant view, but neither I nor anyone else can decisively answer the foregoing and similar questions.

I subscribe to the causal theory of action (CTA), of which there are many forms and many criticisms.²⁰ CTA roughly holds that an event (behavioral or mental) is an action if it is caused in the right way by mental states. I am happy to adopt any version of CTA that accords with common sense and the folk-psychological theory that we always use to explain ourselves to ourselves and to others.²¹ Moreover, there is a plausible philosophical argument that causation can run from the mental to the physical despite the exclusion principle.²² I am not suggesting anything mysterious or any form of *sui generis* agent-causation. In principle, how action happens will be explicable according to whatever scientific laws governing the rest of the universe might be discovered. The task of neuroscience should be to explain agency, not to explain it away reductively.

So there is good foundational reason to adopt the CTA and to continue to

18. PAUL R. MCHUGH & PHILLIP R. SLAVNEY, *THE PERSPECTIVES OF PSYCHIATRY* 11–12 (2d ed. 1998); Ralph Adolphs, *The Unsolved Problems of Neuroscience*, 19 *TRENDS COGNITIVE SCI.* 173,175 (2015).

19. See, e.g., COLIN MCGINN, *THE MYSTERIOUS FLAME: CONSCIOUS MINDS IN A MATERIAL WORLD* (1999).

20. Jesús H. Aguilar & Andrei A. Buckareff, *The Causal Theory of Action: Origins and Issues*, in *CAUSING HUMAN ACTIONS* 1 (Jesús H. Aguilar & Andrei A. Buckareff eds., 2010) (providing a useful overview). The volume contains many excellent chapters addressing the issues in more detail.

21. In this respect, I am particularly attracted to Michael Moore's recently revised account. Michael S. Moore, *Renewed Questions About the Causal Theory of Action*, in *CAUSING HUMAN ACTIONS*, *supra* note 20, at 27. See generally JOHN HYMAN, *ACTION, KNOWLEDGE, AND WILL* (2015) (providing a fascinating account of the current state of the philosophy of action and a surely controversial theory of its own).

22. Christian List & Peter Menzies, *Nonreductive Physicalism and the Limits of the Exclusion Principle*, 106 *J. PHIL.* 475 (2009).

hold that we are agents who can act for, and be guided by, reasons and whose most habitual or thoughtless behavior can be brought under the control of reason if the person has reason to do so.

On the foundational question of whether mental states can be reduced to brain or other physical states, I am most attracted to nonreductive physicalism. We have a mind/brain, which is only one substance, but it has both physical and mental properties. The latter are emergent and cannot be reduced fully to the former. This appears the most commonsensical view, and there is no scientific reason to doubt it at present. The greatest experts cannot resolve this issue; no more can a poor, country lawyer-scholar. Luckily I do not have to. It is sufficient that there are plausible, philosophical accounts that are consistent with CTA and folk-psychological explanations. I am perfectly content opportunistically to adopt any of them.

I am thoroughly a compatibilist on the metaphysical question of whether genuine responsibility is possible in a deterministic (or something quite like that) universe. This is the generic view, expressed in many forms by different theorists,²³ that although no one has libertarian free will—the ability to act uncaused by anything but oneself—genuine responsibility is possible even in a determinist universe. Agents must simply have the capacity to determine their actions by reasons and to act in light of those reasons and are not compelled to act in the ordinary meaning of compulsion (say, a gun to the head). The God-like power of libertarian or contra-causal freedom is not necessary for responsibility on this earth. As is argued below, nothing in current neuroscience suggests that people do not have these capacities,²⁴ and it is clear that most people most of the time are not compelled in the ordinary sense when they act.

Compatibilism is almost certainly the dominant view among professional philosophers,²⁵ but it is of course controversial and a metaphysical question that science cannot resolve. Many people probably intuitively believe that we have

23. See, e.g., John Martin Fischer, *Frankfurt-Type Examples and Semicompatibilism: New Work*, in THE OXFORD HANDBOOK OF FREE WILL 243 (Robert Kane ed., 2d ed. 2011); Michael McKenna, *Contemporary Compatibilism: Mesh Theories and Reasons-Responsive Theories*, in THE OXFORD HANDBOOK OF FREE WILL, *supra*, at 175; Paul Russell, *Moral Sense and the Foundations of Responsibility*, in THE OXFORD HANDBOOK OF FREE WILL, *supra*, at 199; Christopher Taylor & Daniel Dennett, *Who's Still Afraid of Determinism? Rethinking Causes and Possibilities*, in THE OXFORD HANDBOOK OF FREE WILL, *supra*, at 221.

24. See *infra* Part VIII.

25. David Bourget & David J. Chalmers, *What Do Philosophers Believe?*, 170 PHIL. STUD. 465, 476 (2014) (reporting the results of a 2009 survey of professional philosophers that showed that a majority are either compatibilists or tend towards compatibilism); *The PhilPapers Surveys: Preliminary Survey Results*, PHILPAPERS, <http://philpapers.org/surveys/results.pl> [<http://perma.cc/DS94-5RUW>] (last visited Oct. 19, 2015).

libertarian free will, and certainly that belief is consistent with criminal law doctrine. This position is extremely implausible in the modern scientific age, however. Human beings, as complex as they are, are still part of the physical universe and subject to the same laws that govern all phenomena. I will return to the consistency of determinism with doctrines of criminal responsibility below,²⁶ but for now it is sufficient to note that compatibilism is also consistent with all criminal law doctrines and mostly accords with common sense in the modern scientific era. It is a perfectly good home remedy.

I take no position on the vexed question of whether anyone can do otherwise even if the CTA is true. There is dispute about how the principle of alternative possibilities should be interpreted, and, like Jay Wallace,²⁷ I very much doubt that foundational questions of responsibility will be decided by precious deployment of modal logic. There are sufficient, extant arguments to suggest that the principle of alternative possibilities is not a problem.²⁸ They are controversial, but this question will not be solved to everyone's satisfaction, and we have a railroad to run. I am a compatibilist, a perfectly plausible metaphysicist, and will continue to believe that robust responsibility is possible until an incontrovertible argument that all would accept requires me to jettison this view.

In short, CTA and compatibilism are my bedrock metaphysics. If anyone else wishes to claim that I need a particular type of CTA theory or compatibilism, I am happy to take that as a friendly amendment. Giving up CTA or compatibilism would undermine my work in general and the arguments of this Article in particular, but happily, nothing in philosophy or science suggests that I must do so for now.

IV. THE LAW'S PSYCHOLOGY, CONCEPT OF THE PERSON, AND RESPONSIBILITY

Criminal law presupposes a "folk psychological" view of the person and behavior.²⁹ This psychological theory causally explains behavior in part by mental states such as desires, beliefs, intentions, willings, and plans.³⁰

26. See *infra* Part V.

27. R. JAY WALLACE, RESPONSIBILITY AND THE MORAL SENTIMENTS 202, 251–65 (1994).

28. See, e.g., KADRI VIHVELIN, CAUSES, LAWS, AND FREE WILL: WHY DETERMINISM DOESN'T MATTER (2013).

29. Katrina L. Sifferd, *In Defense of the Use of Commonsense Psychology in the Criminal Law*, 25 LAW & PHIL. 571, 571 (2006).

30. This meaning of folk psychology as a casual explanatory theory of action must be distinguished from the usage of the term to refer to bits of folk wisdom about the content of those mental states. For example, folk wisdom is that adolescents are more impulsive than adults. Any of the latter might be disconfirmed by empirical evidence, but the former can be disconfirmed only if the

Biological and other psychological and sociological variables also play a causal role, and a complete explanation would involve variables from all levels of all these fields.³¹ But folk psychology considers mental states fundamental to a full causal explanation and understanding of human action. Lawyers, philosophers, and scientists argue about the definitions of mental states and theories of action, but that does not undermine the general claim that mental states are fundamental. The arguments and evidence that disputants use to convince others presuppose the folk-psychological view of the person. Brains do not convince each other, people do. Folk psychology presupposes only that human action will at least be rationalizable by mental state explanations or will be responsive to reasons—including incentives—under the right conditions.

For example, the folk-psychological explanation for why you are reading this Article is roughly that you desire to understand the relation of neuroscience to criminal responsibility; you believe that reading the Article will help fulfill that desire. As a result of your desire and belief, you formed the intention to read it. This is a practical, rather than a deductive, syllogism.

Brief reflection should indicate that the law's psychology must be a folk-psychological theory, a view of the person as a conscious—and potentially self-conscious—creature who forms and acts on intentions that are the product of the person's other mental states. We are the sort of creatures who can act for, and respond to, reasons. The law treats persons generally as intentional creatures and not simply as mechanistic forces of nature.

Law is primarily action-guiding and is not able to guide people directly and indirectly unless people are capable of using rules as premises in their reasoning about how they should behave. Unless people could be guided by law, it would be useless (and perhaps incoherent) as an action-guiding system of rules.³² Legal

radical critique is demonstrated to be true. See *infra* Part VIII for a discussion of this possibility.

31. This is known as a multilevel, multilevel mode of explanation. See CARL F. CRAVER, *EXPLAINING THE BRAIN: MECHANISMS AND THE MOSAIC UNITY OF NEUROSCIENCE* (2007).

32. See GEORGE SHER, *IN PRAISE OF BLAME* 123 (2006) (stating that although philosophers disagree about the requirements and justifications of what morality requires, there is widespread agreement that "the primary task of morality is to guide action"); Scott J. Shapiro, *Law, Morality, and the Guidance of Conduct*, 6 *LEGAL THEORY* 127, 131–32 (2000); John R. Searle, *End of the Revolution*, 49 *N.Y. REV. BOOKS*, at 33, 35 (2002).

This view assumes that law is sufficiently knowable to guide conduct, but a contrary assumption is largely incoherent. As Shapiro writes:

Legal skepticism is an absurd doctrine. It is absurd because the law cannot be the sort of thing that is unknowable. If a system of norms were unknowable, then that system would not be a legal system. One important reason why the law must be knowable is that its function is to guide conduct.

Shapiro, *supra*, at 131. I do not assume that legal rules are always clear and thus capable of precise action guidance. If most rules in a legal system were not sufficiently clear most of the time, however,

rules are action-guiding primarily because these rules provide an agent with good moral or prudential reasons for forbearance or action. Human behavior can be modified by means other than influencing deliberation, and human beings do not always deliberate before they act. Nonetheless, the law presupposes folk psychology, even when we most habitually follow the legal rules. Unless people are capable of understanding and then using legal rules to guide their conduct, the law is powerless to affect human behavior.

The legal view of the person does not hold that people must always reason or consistently behave rationally according to some preordained, normative notion of rationality. Rather, the law's view is that people are capable of minimal rationality according to predominantly conventional, socially constructed standards. The type of rationality the law requires is the ordinary person's commonsense view of rationality, not the technical notion that might be acceptable within the disciplines of economics, philosophy, psychology, computer science, and the like. Rationality is a congeries of abilities, including *inter alia* getting the facts straight, having a relatively coherent preference-ordering, understanding what variables are relevant to action, and the ability to understand how to achieve the goals one has (instrumental rationality). How these abilities should be interpreted and how much of them are necessary for responsibility may be debated, but the debate is about rationality.

Virtually everything for which agents deserve to be praised, blamed, rewarded, or punished is the product of mental causation and, in principle, is responsive to reasons, including incentives. Machines may cause harm, but they cannot do wrong, and they cannot violate expectations about how people ought to live together. Machines do not deserve praise, blame, reward, punishment, concern, or respect because they exist or as a consequence of the results they cause. Only people, intentional agents with the potential to act, can do wrong and violate expectations of what they owe each other.

Many scientists and some philosophers of mind and action might consider folk psychology to be a primitive or prescientific view of human behavior. For the foreseeable future, however, the law will be based on the folk-psychological model of the person and behavior described. Until and unless scientific discoveries convince us that our view of ourselves is radically wrong, the basic explanatory apparatus of folk psychology will remain central. It is vital that we not lose sight of this model lest we fall into confusion when various claims based on neuroscience or other sciences are made. If any science is to have appropriate influence on current criminal law and legal decision making, the science must be relevant to and translated into the law's folk-psychological framework.

the system could not function. Further, the principle of legality dictates that criminal law rules should be especially clear.

All of the criminal law's doctrinal criteria for criminal responsibility are folk psychological. Begin with the definitional criteria, the "elements" of crime. The "voluntary" act requirement is defined, roughly, as an *intentional* bodily movement—or omission in cases in which the person has a duty to act—done in a reasonably integrated state of consciousness. Other than crimes of strict liability, all crimes also require a culpable mental state, such as purpose, knowledge, or recklessness. All affirmative defenses of justification and excuse involve an inquiry into the person's mental state, such as the belief that self-defensive force was necessary or the lack of knowledge of right from wrong.

Our folk-psychological concepts of criminal responsibility follow logically from the action-guiding nature of law itself, from its folk-psychological concept of the person and action, and from the aims of achieving retributive justice, which holds that no one should be punished unless he deserves it and no more than he deserves, and the maximization of social safety. The general capacity for rationality is the primary condition for responsibility, and the lack of that capacity is the primary condition for excusing a person. If human beings were not rational creatures who could understand the good reasons for action and were not capable of conforming to legal requirements through intentional action or forbearance, the law could not adequately guide action and would not be just. Legally responsible agents are therefore people who have the general capacity to grasp and be guided by good reason in particular legal contexts.³³

In cases of excuse, the agent who has done something wrong acts for a reason but is either incapable of rationality generally or incapable on the specific occasion in question. This explains, for example, why young children and some people with mental disorders are not held responsible. The amount of lack of capacity for rationality that is necessary to find the agent not responsible is a moral, social, political, and, ultimately, a legal issue. It is not a scientific, medical, psychological, or psychiatric issue.

Compulsion or coercion is also an excusing condition. Literal compulsion exists when the person's bodily movement is a pure mechanism that is not rationalizable by reference to the agent's mental states. These cases defeat the requirement of a "voluntary act." For example, a tremor or spasm produced by a neurological disorder is not an action because it is not intentional and, therefore, defeats the ascription of a voluntary act. Metaphorical compulsion exists when an agent acts intentionally but in response to some hard choice imposed on the agent through no fault of his or her own. For example, if a miscreant holds a gun to an agent's head and threatens to kill her unless she kills another innocent person, it would be wrong to kill under these circumstances. Nevertheless, the

33. I adapt the felicitous phrase "to grasp and be guided by good reason" from WALLACE, *supra* note 27, at 86.

law may decide as a normative matter to excuse the act of intentional killing because the agent was motivated by a threat so great that it would be supremely difficult for most citizens to resist.³⁴

Cases involving internal compulsive states are more difficult to conceptualize because it is difficult to define and assess “loss of control.”³⁵ The cases that most fit this category are “disorders of desire,” such as addictions and sexual disorders. The question is why these acting agents lack control but other people with strong desires do not. If people frequently yield to their apparently very strong desires at great social, medical, occupational, financial, and legal cost to themselves, agents will often say they could not help themselves, they were not in control, and an excuse or mitigation is therefore warranted. But why mitigation or excuse should obtain is difficult to understand.

V. DANGEROUS DISTRACTIONS CONCERNING NEUROSCIENCE AND CRIMINAL RESPONSIBILITY

This part considers a number of related issues that are often thought to be relevant to criminal responsibility and competence but that are in fact irrelevant, confusing, and distracting: free will, causation as an excuse, causation as compulsion, prediction as an excuse, dualism, and the non-efficacy of mental states, many of which have already been touched upon. It is important to correct these errors because much of the unjustified legal exuberance about the contributions of neuroscience to criminal law flows from them. The legal exuberance also flows, however, from unrealistic expectations about the scientific accomplishments of neuroscience. A later part of this Article addresses the scientific exuberance.

Contrary to what many people believe, and what judges and others sometimes say, free will is not a legal criterion that is part of any doctrine, and it is not even foundational for criminal responsibility.³⁶ As Part III noted when adopting a compatibilist metaphysics about responsibility, criminal law doctrines are fully consistent with the truth of determinism or universal causation that allegedly undermines the foundations of responsibility. Even if determinism is true, some people act and some people do not. Some people form prohibited mental states, and some do not. Some people are legally insane or act under duress when they

34. I recognize that the common law and most state codes do not permit a duress excuse when innocent life is taken. In contrast, section 2.09 of the Model Penal Code would permit the excuse in appropriate cases, and this example makes the point most clearly without confusing duress/necessity as a justification and duress as an excuse.

35. Stephen J. Morse, *Uncontrollable Urges and Irrational People*, 88 VA. L. REV. 1025, 1035 (2002); see *Kansas v. Crane*, 534 U.S. 407, 423–24 (2001) (Scalia, J., dissenting).

36. Stephen J. Morse, *The Non-Problem of Free Will in Forensic Psychiatry and Psychology*, 25 BEHAV. SCI. & L. 203, 207 (2007).

commit crimes, but most defendants are not legally insane or acting under duress. Moreover, these distinctions matter to moral and legal theories of responsibility and fairness that we have reason to endorse. Criminal law addresses problems genuinely related to responsibility, including consciousness, the formation of mental states such as intention and knowledge, the capacity for rationality, and compulsion. The law, however, never addresses the presence or absence of free will.

When most people use the term “free will” in the context of legal responsibility, they are typically using it loosely as a synonym for the conclusion that the defendant was or was not criminally responsible. They typically have reached this conclusion for reasons that do not involve free will understood as contra-causal freedom—for example, that the defendant was legally insane or acted under duress—but such use of the term, “free will,” only perpetuates misunderstanding and confusion. Once the legal criteria for excuse have been met—and no excuse includes lack of free will as a criterion—the defendant will be excused without any reference whatsoever to free will as an independent ground for excuse.

There is a genuine metaphysical problem regarding free will, which is whether human beings have the capacity to act uncaused by anything other than themselves and whether this capacity is a necessary foundation for holding anyone legally or morally accountable for criminal conduct. Philosophers and others have debated these issues in various forms for millennia, and there is no resolution in sight. Indeed, some people might think that the problem is insoluble. This is a philosophical issue, but it is not a problem for the law, and neuroscience raises no new challenge to this conclusion. Solving the free will problem would have profound implications for responsibility doctrines and practices, such as blame and punishment, but having or lacking libertarian freedom is not a criterion of any civil or criminal law doctrine.

Neuroscience is simply the most recent, mechanistic causal science that appears deterministically to explain behavior. Neuroscience thus joins social structural variables, behaviorism, genetics, and other scientific explanations that have also been deterministic explanations for behavior. In principle, however, neuroscience adds nothing new, even if neuroscience is a better, more persuasive science than some of its predecessors. No science, including neuroscience, can demonstrate that libertarian free will does or does not exist. As long as free will in the strong sense is not foundational for just blame and punishment and is not a criterion at the doctrinal level, the truth of determinism or universal causation poses no threat to legal responsibility. Neuroscience may help shed light on folk-psychological excusing conditions, such as automatism or legal insanity, but the truth of determinism is not an excusing condition. The law will be fundamentally challenged only if neuroscience, or any other science, can conclusively

demonstrate that the law's psychology is wrong and that we are not the type of creatures for whom mental states are causally effective. This is a different question from whether determinism undermines responsibility, however, and this Article returns to it below.

A related confusion is that behavior is excused if it is caused, but causation per se is not a legal or moral mitigating or excusing condition. I termed this confusion the "fundamental psycholegal error."³⁷ At most, causal explanations can only provide evidence concerning whether a genuine excusing condition, such as lack of rational capacity, was present. Brain causation—or any other kind of causation—does not mean that we are automatons, not really acting agents at all, or otherwise excused. Even a genuinely abnormal cause is not per se an excusing condition. For example, imagine an armed robber who suffers from intermittent hypomania and who only robs when he is clinically hypomanic because only then does he feel sufficiently energetic and confident. In other words, the hypomania is a "but for" cause of his robberies. Nevertheless, he would not be excused for an armed robbery because hypomania seldom compromises rational capacity sufficiently to warrant an excuse. If he committed an armed robbery under the influence of a delusional belief his mania produced, then he might be excused by reason of legal insanity. In that case, the excusing condition would be compromised rationality and not the mania per se. In short, a neuroscientific causal explanation for criminal conduct, like any other type of causal explanation, does not per se mitigate or excuse. It only provides evidence that might help the law resolve whether a genuine excuse existed, or it may in the future provide data that might be a guide to prophylactic or rehabilitative measures.

All behavior is the product of the necessary and sufficient causal conditions without which the behavior would not have occurred, including brain causation, which is always part of the causal explanation for any behavior. If causation were an excusing condition per se, then no one would be responsible for any behavior. Some people might welcome such a conclusion and believe that responsibility is impossible, but this is not the legal and moral world we inhabit. The law holds most adults responsible for most of their conduct, and genuine excusing conditions are limited. Unless the person's history or mental condition, for example, provides evidence of an existing excusing or mitigating condition, such as lack of rational capacity, there is no reason for excuse or mitigation.

Compulsion is a genuine mitigating or excusing condition, but causation—including brain causation—is not the equivalent of compulsion. Part IV showed that compulsion may be either literal or metaphorical and normative. It is crucial to recognize that most human action is not plausibly the result of either type of

37. Stephen J. Morse, *Culpability and Control*, 142 U. PA. L. REV. 1587, 1592–94 (1994).

compulsion, but all human behavior is caused by its necessary and sufficient causes—including brain causation. Even abnormal causes are not necessarily compelling. To illustrate, suppose that a person has weak pedophilic urges and weak sexual urges in general. If this person molested a child, there would be no ground for a compulsion excuse. If causation were the equivalent of compulsion, all behavior would be compelled and no one would be responsible. Once again, this is not a plausible account of the law's responsibility conditions. Causal information from neuroscience might help us resolve questions concerning whether legal compulsion existed, or it might be a guide to prophylactic or rehabilitative measures when dealing with plausible legal compulsion. Causation, however, is not per se compulsion.

Causal knowledge, whether from neuroscience or any other science, can enhance the accuracy of behavioral predictions, but predictability is also not a per se excusing or mitigating condition, even if the predictability of the behavior is perfect. To understand this, consider how many things we do that are perfectly predictable but for which there is no plausible excusing or mitigating condition. If the variables that enhance prediction also produce a genuine excusing or mitigating condition, then excuse or mitigation is justified for the latter reason and independent of the prediction.

For example, recent research demonstrates that a history of childhood abuse coupled with a specific, genetically produced enzyme abnormality that produces a neurotransmitter deficit increases the risk that a person will behave antisocially as an adolescent or young adult.³⁸ Does this mean that an offender with this gene by environment interaction is not responsible or less responsible? No. The offender may not be fully responsible or responsible at all but not because there is a causal explanation. What is the intermediary excusing or mitigating principle? Are these people, for instance, more impulsive? Are they lacking rationality? What is the actual excusing or mitigating condition?

Most informed people are not “dualists” concerning the relation between the mind and the brain. That is, they no longer think that our minds (or “souls”) are independent of our brains and bodies more generally and can somehow exert a causal influence over our bodies. It may seem as if the law's emphasis on the importance of mental states as causing behavior is based on a prescientific, outmoded form of dualism, but this is not the case. Although the brain enables the mind, we have no idea how this occurs and have no idea how action is possible.³⁹ It is clear that, at the least, mental states are dependent upon or supervene on brain states, but neither neuroscience nor any other science has

38. See, e.g., Avshalom Caspi et al., *Role of Genotype in the Cycle of Violence in Maltreated Children*, 297 SCIENCE 851 (2002). Indeed, the risk is nine times higher.

39. See MCHUGH & SLAVNEY, *supra* note 18, at 11–12; Adolphs, *supra* note 18, at 175.

demonstrated that mental states do not play an independent and partial causal role.

Despite our lack of understanding of the mind-brain-action relation, the Introduction to this Article showed that some scientists question whether mental states have any causal effect, thus treating mental states as psychic appendices that evolution has created but that have no genuine function. These claims are not strawpersons. They are made by serious, thoughtful people.⁴⁰ As discussed in Part VIII below, if accepted, they would create a complete and revolutionary paradigm shift in the law of criminal responsibility and more widely.

In conclusion, legal actors concerned with criminal law policy, doctrine, and adjudication must always keep the folk-psychological view present in their minds when considering claims or evidence from neuroscience and must always question how the science is legally relevant to the law's action and mental-states criteria. The truth of determinism, causation, and predictability do not in themselves answer any doctrinal or policy issue.

VI. LOST IN TRANSLATION? LEGAL RELEVANCE AND THE NEED FOR TRANSLATION

What in principle is the possible relation of neuroscience to the criminal law's responsibility doctrines canvassed in Part IV? We must begin with a distinction between internal relevance and external relevance. An internal contribution or critique accepts the general coherence and legitimacy of a set of legal doctrines, practices, or institutions and attempts to explain or alter them. For example, an internal contribution to criminal responsibility may suggest the need for doctrinal reform of, say, the insanity defense, but it would not suggest that the notion of criminal responsibility is itself incoherent or illegitimate. By contrast, an externally relevant critique suggests that the doctrines, practices, or institutions are incoherent, illegitimate, or unjustified. Because a radical, external critique has little possibility of success at present (as is explained below), I make the simplifying assumption that the contributions of neuroscience will be internal and thus will need to be translated into the law's folk-psychological concepts.

The law's criteria for responsibility and competence are essentially behavioral—acts and mental states. The criteria of neuroscience are mechanistic—neural structure and function. Is the apparent chasm between those two types of discourse bridgeable? This is a familiar question in the field of law and mental health,⁴¹ but there is even greater dissonance in law and neuroscience. Psychiatry and psychology sometimes treat behavior mechanistically, sometimes

40. See, e.g., Greene & Cohen, *supra* note 3, at 219.

41. See, e.g., ALAN A. STONE, LAW, PSYCHIATRY, AND MORALITY 95–96 (1984).

treat it folk psychologically, and sometimes blend the two. Consider depression, which may be understood both biologically and psychologically. Even the most biologically oriented psychiatrist treating a depressed patient with antidepressant medication will also inquire about the course of the patient's life (if the psychiatrist is competent). In many cases, the psychological sciences are quite close to folk psychology in approach. Neuroscience, in contrast, is purely mechanistic and eschews folk-psychological concepts and discourse. Neurons, neural networks, and the connectome do not act intentionally for reasons. They have no sense of past, present, or future and no aspirations. They do not recognize that they will die. Thus, the gap will be harder to bridge for neuroscience than for psychiatry and psychology.

The brain does enable the mind (even if we do not know how this occurs). Therefore, facts we learn about brains in general, or about a specific brain, could in principle provide useful information about mental states and about human capacities in general and in specific cases. Some believe that this conclusion is a category error.⁴² This is a plausible view, and perhaps it is correct. If it is, then the whole subject of the relation of neuroscience to law is mostly empty. Let us, therefore, bracket this pessimistic view and determine what follows from the more optimistic position that what we learn about the brain and nervous system can be potentially helpful to resolving questions of criminal responsibility if the findings are properly translated into the law's psychological framework.

The question is whether the new neuroscience is legally relevant because it makes a proposition about responsibility more or less likely to be true. Any legal criterion must be established independently, and biological evidence must be translated into the criminal law's folk-psychological behavioral criteria. That is, the expert must be able to explain precisely how the neuroevidence bears on whether the agent acted, formed the required mens rea, or met the criteria for an excusing condition. If the evidence is not directly relevant, the expert should be able to explain the chain of inference from the indirect evidence to the law's criteria. No hand-waving should be permitted by allowing the expert or scholar to move directly from indirect evidence to a legal conclusion. The chain of reasoning should be clear and plausible. At present, as I explain in the next part, few such data exist, but neuroscience is advancing so rapidly that such data may exist in the near or medium term. Moreover, the argument is conceptual and does not depend on any particular neuroscience findings.

The problem of translation is going to be fearsomely hard. As the next part indicates, present neuroscience is not likely to help us with the marginal legal

42. See, e.g., MAX R. BENNETT & P.M.S. HACKER, PHILOSOPHICAL FOUNDATIONS OF NEUROSCIENCE 112, 270, 360, 381 (2003). PARDO & PATTERSON, *supra* note 7, at 135, also share much of this caution.

cases, even if the translation problem is solved in an individual case. For the most part, we will have to rely on careful behavioral investigation and plenty of common sense.

VII. THE PRESENT LIMITS OF NEUROSCIENCE AND ITS LEGAL IMPLICATIONS

Most generally, the relation of brain, mind, and action is one of the hardest problems in all science. Once again, we have no idea how the brain enables the mind or how action is possible.⁴³ The brain-mind-action relation is a mystery not because it is inherently not subject to scientific explanation, but because the problem is so hard. For example, we would like to know the difference between a neuromuscular spasm and intentionally moving one's arm in exactly the same way. The former is a purely mechanical motion, whereas the latter is an action, but we cannot explain the difference between the two. The philosopher, Ludwig Wittgenstein, famously asked: "Let us not forget this: when 'I raise my arm', my arm goes up. And the problem arises: what is left over if I subtract the fact that my arm goes up from the fact that I raise my arm?"⁴⁴ We know that a functioning brain is a necessary condition for having mental states and for acting. After all, if your brain is dead, you have no mental states and are not acting. Still, we do not know how mental states and action are caused.

Despite the astonishing advances in neuroimaging and other neuroscientific methods, we still do not have sophisticated causal knowledge of how the brain works generally, and we have little information that is legally relevant. The scientific problems are fearsomely difficult. Only in the present century have researchers begun to accumulate much data from fMRI imaging, which is the technology that has generated most of the legal interest. New artifacts are constantly being discovered.⁴⁵ Moreover, virtually no studies have been performed to address specifically legal questions. The criminal justice system should not expect too much of a young science that uses new technologies to investigate some of the most dreadfully difficult problems in science and that

43. See MCHUGH & SLAVNEY, *supra* note 18, at 11–12; Adolphs, *supra* note 18, at 175.

44. LUDWIG WITTGENSTEIN, *PHILOSOPHICAL INVESTIGATIONS* ¶ 621 (G.E.M. Anscombe trans., 1953) (1953).

45. E.g., Craig M. Bennett et al., *The Principled Control of False Positives in Neuroimaging*, 4 SOC. COGNITIVE & AFFECTIVE NEUROSCIENCE 417 (2009) (indicating that a high percentage of previous fMRI studies did not properly control for false positives by controlling for what is called "multiple comparisons"). This problem was termed by one group of authors "voodoo correlations," but they toned back the claim to more scientifically respectable language. Edward Vul et al., *Puzzlingly High Correlations in fMRI Studies of Emotion, Personality, and Social Cognition*, 4 PERSP. ON PSYCHOL. SCI. 274 (2009). Needless to say, there was pushback against such criticisms. See, e.g., Matthew D. Lieberman et al., *Correlations in Social Neuroscience Aren't Voodoo: A Commentary on Vul et al. (2009)*, 4 PERSP. ON PSYCHOL. SCI. 299 (2009). As any old country lawyer knows, when a stone is thrown into a pack of dogs, the one that gets hit yelps.

does not directly address questions of legal interest.

Before turning to the specific reasons for neuromodesty, a few preliminary points of general applicability must be addressed. The first and most important is contained in the message of Part V. Causation by biological variables, including abnormal biological variables, does not per se create an excusing or mitigating condition. Any excusing condition must be established independently. The goal is always to translate the biological evidence into the criminal law's folk-psychological criteria. Assessing criminal responsibility involves a retrospective evaluation of the defendant's mental states at the time of the crime. No criminal wears a portable scanner or other neurodetection device that provides a measurement at the time of the crime, at least not yet. Further, neuroscience is insufficiently developed to detect specific, legally relevant mental content or to provide a sufficiently accurate diagnostic marker for even a severe mental disorder.⁴⁶ Nonetheless, certain aspects of neural structure and function that bear on legally relevant capacities, such as the capacity for rationality and control, may be temporally stable in general or in individual cases. If they are, neuroevidence may permit a reasonably valid retrospective inference about the defendant's rational and control capacities and their impact on criminal behavior. This will, of course, depend on the existence of adequate science to do this. We currently lack such science,⁴⁷ but future research may provide the necessary data.⁴⁸

Now let us consider the specific grounds for neuromodesty in cognitive, affective, and social neuroscience, the sub-disciplines most relevant to law. At present, most neuroscience studies on human beings involve very small numbers of subjects, although this phenomenon is rapidly starting to change as the cost of scanning decreases. Future studies will have more statistical power. Most of the studies have been done on college and university students, who are hardly a random sample of the population generally and of criminal offenders specifically. There is also a serious question of whether findings based on subjects' behavior

46. Stephen J. Morse & William T. Newsome, *Criminal Responsibility, Criminal Competence, and Prediction of Criminal Behavior*, in A PRIMER ON CRIMINAL LAW AND NEUROSCIENCE 150, 159–60, 167 (Stephen J. Morse & Adina L. Roskies eds., 2013).

47. *Id.* at 166–67 (explaining generally that, except in the cases of a few well-characterized medical disorders such as epilepsy, current neuroscience has little to add to resolving questions of criminal responsibility).

48. In contrast, questions concerning various criminal competencies, such as competence to stand trial or to plead guilty, and predictions of future behavior are based on a subject's present condition. Thus, the problems besetting retrospective responsibility analysis do not apply to such issues. The criteria for competence are functional. They ask whether the subject can perform some task—such as understanding the nature of a criminal proceeding or understanding a treatment option that is offered—at a level the law considers normatively acceptable to warrant respecting the subject's choice and autonomy. Prediction questions simply ask about the probability of some particular future behavior's occurring within some time frame, but the law's criteria for predictions are typically framed as standards and thus allow room for normative judgment.

and brain activity in a scanner would apply to real-world situations. This is known as the problem of “ecological validity.” Does a subject’s performance in a laboratory on an executive function task in a scanner really predict the person’s ability to resist criminal offending?⁴⁹

Most studies average the neurodata over the subjects, and the average finding may not accurately describe the brain structure or function of any actual subject in the study. Replications are few, which is especially important for law. Policy and adjudication should not be influenced by findings that are insufficiently established, and replications of findings are crucial to our confidence in a result, especially given the problem of publication bias. Finally, the neuroscience of cognition and interpersonal behavior is largely in its infancy and what is known is quite coarse-grained and correlational, rather than fine-grained and causal.⁵⁰ What is being investigated is an association between a condition or a task in the scanner and brain activity. These studies do not demonstrate that the brain activity is a sensitive diagnostic marker for the condition or either a necessary, sufficient, or predisposing causal condition for the behavioral task that is being done in the scanner. Any language that suggests otherwise—such as claiming that some brain region is the neural substrate for the behavior—is simply not justifiable based on the methodology of most studies. Such inferences are only justified if everything else in the brain remained constant, which is seldom the case.⁵¹ Moreover, activity in the same region may be associated with diametrically opposite behavioral phenomena—for example, love and hate.

There are also technical and research design difficulties. It takes many mathematical transformations to get from the raw fMRI data to the images of the brain that are increasingly familiar. Explaining these transformations is beyond me, but I do understand that the likelihood that an investigator will find a statistically significant result depends on how the researcher sets the threshold for significance. There is dispute about this, and the threshold levels are conventional. If the threshold changes, so does the outcome. I have been

49. For example, the famous Stroop test asks subjects to state the color in which a color word is written, rather than simply to read the word itself. Thus, if the word “red” is written in yellow, the correct answer is yellow. We all have what is known as a strong prepotent response (a strong behavioral disposition) simply to read the word rather than to identify the color in which it is written. It takes a lot of inhibitory ability to refrain from the prepotent response. But are people who do poorly on the Stroop more predisposed to commit violent crimes even if the associated brain activation is consistent with decreased prefrontal control in subjects? We do not know. And in any case, what legally relevant, extra information does the neuroscience add to the behavioral data with which it was correlated?

50. See, e.g., Gregory A. Miller, *Mistreating Psychology in the Decades of the Brain*, 5 *PERSP. ON PSYCHOL. SCI.* 716 (2010) (providing a cautious, thorough overview of the scientific and practical problems facing cognitive and social neuroscience).

51. Adolphs, *supra* note 18, at 173.

convinced by neuroscience colleagues that many such technical difficulties have largely been solved, but research design and potentially unjustified inferences from the studies are still an acute problem. It is extraordinarily difficult to control for all conceivable artifacts. Consequently, there are often problems of over-inference.

Neuroscience also shares with other sciences what is known as the G2i problem, which is how to make inferences about a particular individual based on group data.⁵² Scientists are interested in how the world works and produce general information. Law is often concerned with individual cases, and it is difficult to know how properly to apply relevant group data. For example, as noted, a neuroscience study that reports increased activation in some brain region of interest bases its conclusion on averaging the activation across all the subjects, but no subject's brain may have activated precisely in the area identified. If such group data are permitted, as they now are for functions such as predictions, the question is how to use probabilistic data to answer what is often a binary question.⁵³ This is a topic under intensive investigation at present, and I assume progress will be made.

Over time, all these problems identified may ease as imaging and other techniques become less expensive and more accurate, research designs become more sophisticated, and the sophistication of the science increases generally.

How should the law respond when valid and relevant neuroevidence is inconsistent with the defendant's behavior? Recall that the criminal law's criteria are all behavioral—actions and mental states. Therefore, cases of malingering aside, actions speak louder than images. This is a truism for all criminal responsibility. If the finding of any test or measurement of behavior is contradicted by actual behavioral evidence, then we must believe the real world behavioral evidence because it is more direct and probative of the law's behavioral criteria. For example, if the person behaves rationally in a wide variety of circumstances, the agent is rational even if the brain appears structurally or functionally abnormal. We confidently knew that some people

52. See generally David L. Faigman, John Monahan & Christopher Slobogin, *Group to Individual (G2i) Inference in Scientific Expert Testimony*, 81 U. CHI. L. REV. 417 (2014).

53. For an interesting current example of this problem in the context of the capital punishment proceeding for Dzhokhar Tsarnaev, the defendant convicted of the Boston Marathon bombings, see Sally Satel & Scott O. Lilienfeld, *The "Immature Teen Brain" Defense and the Dzhokhar Tsarnaev Trial*, WASH. POST (May 7, 2015), <http://www.washingtonpost.com/news/volokh-conspiracy/wp/2015/05/07/the-immature-teen-brain-defense-and-the-dzhokhar-tsarnaev-trial/> [<http://perma.cc/8F6J-W5K5>], and Sally Satel & Scott O. Lilienfeld, *Neuro-expert testifies for Tsarnaev*, WASH. POST (May 11, 2015), <http://www.washingtonpost.com/news/volokh-conspiracy/wp/2015/05/11/neuro-expert-testifies-for-tsarnaev/> [<http://perma.cc/VB4D-PVBP>]. In the event, the jury was not swayed by the general neuroscientific data about the juvenile brain and sentenced Tsarnaev to death.

were behaviorally abnormal, such as being psychotic (grossly out of touch with reality), long before there were any psychological or neurological tests for such abnormalities.

An analogy from physical medicine may be instructive. Suppose someone complains about back pain, a subjective symptom, and the question is whether the subject actually does have back pain. We know that many people with abnormal spines do not experience back pain, and many people who complain of back pain have normal spines. If the person is claiming a disability and the spine looks dreadful, evidence that the person regularly exercises on a trampoline without difficulty indicates that there is no disability caused by back pain. If there is reason to suspect malingering, however, and there is not clear behavioral evidence of lack of pain, then a completely normal spine might be of use in deciding whether the claimant is malingering. Unless the correlation between the image and the legally relevant behavior is very powerful, however, such evidence will be of limited help. Further, although the neuroscience of pain is making advances,⁵⁴ neuroscience cannot be used at present to diagnose mental disorder because scanning is insufficiently sensitive for these purposes.⁵⁵

If the behavioral data are not clear, then the potential contribution of neuroscience is large. Unfortunately, it is in just such cases that neuroscience at present is not likely to be of much help. I term the reason for this the “clear cut” problem.⁵⁶ Virtually all neuroscience studies of potential interest to the law involve some behavior that has already been identified as of interest, and the point of the study is to identify that behavior’s neural correlates. Neuroscientists do not go on general “fishing” expeditions.⁵⁷ There is usually some bit of behavior—such as addiction, schizophrenia or impulsivity—that investigators would like to understand better by investigating its neural correlates. To do this

54. Amanda C. Pustilnik, *Imaging Brains, Changing Minds: How Pain Neuroimaging Can Help Transform the Law*, 66 ALA. L. REV. 1099 (forthcoming 2015).

55. Allen Frances, *Whither DSM-V?*, 195 BRIT. J. PSYCHIATRY 391 (2009). Many studies do find differences between patients with mental disorders and controls, but the differences are too small to be used diagnostically. See generally John P.A. Ioannidis, *Excess Significance Bias in the Literature on Brain Volume Abnormalities*, 68 ARCHIVES GEN. PSYCHIATRY 773 (2011) (claiming, based on a meta-analysis of studies of brain volume abnormalities in patients with mental disorders, that many more studies than should be expected found statistically significant results and that this can be best explained by bias in the reporting of the data).

56. Morse, *supra* note 6, at 540.

57. For an amusing exception, see Craig M. Bennett et al., *Neural Correlates of Interspecies Perspective Taking in the Post-Mortem Atlantic Salmon: An Argument for Proper Multiple Comparisons Correction*, 1 J. SERENDIPITOUS & UNEXPECTED RESULTS 1 (2009), <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.161.8384&rep=rep1&type=pdf> [<http://perma.cc/VU7B-K5DJ>]. The study scanned a dead Atlantic salmon to demonstrate that significant results can be obtained from the most unpromising investigation unless the research design properly controls for chance findings (false positives).

properly presupposes that the researchers have already well-characterized and validated the behavior under neuroscientific investigation. Thus, neurodata can be no more valid than the behavior with which it is correlated. In such cases, the neural markers might be quite sensitive to the already clearly identified behaviors precisely because the behavior is so clear. Less clear behavior is simply not studied, or the overlap in data about less clear behavior is greater between experimental and comparison subjects. Thus, the neural markers of clear cases will provide little guidance to resolve behaviorally ambiguous cases of legally relevant behavior, and they are unnecessary if the behavior is sufficiently clear.

On occasion, the neuroscience might suggest that the behavior is not well-characterized or is neurally indistinguishable from other, seemingly different behavior. In general, however, the existence of legally relevant behavior will already be apparent before the neuroscientific investigation is begun. For example, some people are grossly out of touch with reality. If, as a result, they do not understand right from wrong, we excuse them because they lack such knowledge. We might learn a great deal about the neural correlates of such psychological abnormalities. But we already knew without neuroscientific data that these abnormalities existed, and we had a firm view of their normative significance. In the future, however, we may learn more about the causal link between the brain and behavior, and studies may be devised that are more directly legally relevant. I suspect that we are unlikely to make substantial progress with neural assessment of legally relevant mental content, but we are likely to learn more about capacities that will bear on excuse or mitigation.

If actions speak louder than images and the clear cut problem exists, however, what room is there for introducing neuroevidence in legal cases? Let us begin with cases in which the behavioral evidence is clear and permits an equally clear inference about the defendant's mental state. For example, lay people may not know the technical term to apply to people who are manifestly out of touch with reality, but they will readily recognize this unfortunate condition. No further tests of any sort will be necessary to prove that the subject suffers from seriously impaired rationality. In such cases, neuroevidence will be at most convergent and increase our confidence in what we already had confidently concluded. Determining if it is worth collecting the neuroevidence will depend on whether the cost-benefit analysis justifies obtaining convergent evidence.

Roper v. Simmons is the most striking example of a case in which the behavioral evidence was clear.⁵⁸ In *Roper*, the United States Supreme Court categorically excluded the death penalty for capital murderers who killed when they were sixteen or seventeen years old on the grounds that adolescents do not

58. See *Roper v. Simmons*, 543 U.S. 551 (2005).

deserve the death penalty.⁵⁹ The amicus briefs were replete with neuroscience data showing that the brains of late adolescents are not fully, biologically mature, and advocates used these data to suggest that adolescent killers could not be fairly put to death.⁶⁰ Now, we already knew from commonsense observation and from rigorous behavioral studies that juveniles are on average less rational than adults. What could the neuroscientific evidence about the juvenile brain have added? It was consistent with the undeniable behavioral data and perhaps provided a partial causal explanation of the behavioral differences. The proffered neuroscience data were therefore merely additive and only indirectly relevant, and the Supreme Court did not cite these data, except perhaps by implication when it referred vaguely to “other” scientific evidence.⁶¹

Whether adolescents are sufficiently less rational on average than adults, to exclude them categorically from the death penalty is a normative legal question and not a scientific or psychological question. Advocates claimed, however, that the neuroscience confirmed that adolescents are insufficiently responsible to be executed, thus confusing the positive and the normative. The neuroscience evidence in no way independently confirms that adolescents are less responsible. If the behavioral differences between adolescents and adults were slight, it would not matter if their brains were quite different. Similarly, if the behavioral differences were sufficient for moral and constitutional differential treatment, then it would not matter if the brains were essentially indistinguishable. If the brains were indistinguishable, the most sensible inference would be that neuroscience is not yet sensitive enough to track the behavioral differences, not that we are mistaken about whether behavioral differences exist.

For another example, suppose that in an insanity defense case the question is whether the defendant suffers from a major mental disorder such as schizophrenia. In extreme cases, the behavior will be clear, and no neurodata will

59. *Id.* at 578–79.

60. *E.g.*, Brief of the American Medical Association et al. as Amici Curiae in Support of Respondent, *Roper v. Simmons*, 543 U.S. 551 (2005) (No. 03-633).

61. *Id.* at 569, 573. The Supreme Court referred generally to other science, but it was not clear whether neuroscience played a specific role. The Supreme Court did cite neuroscientific findings in *Graham v. Florida*, 560 U.S. 48, 77–82 (2010), which categorically excluded juveniles from life without the possibility of parole in non-homicide cases, and in *Miller v. Alabama*, 132 S. Ct. 2455, 2460 (2012), which held that the sentence of life without possibility of parole was constitutional for juveniles who committed homicide crimes but that it was unconstitutional to impose this penalty mandatorily. In both cases, the citation was conclusory and generally non-specific, and I believe it was dictum. The Supreme Court was responding in *Graham* to an argument that no party had seriously made, which was that the science of adolescent development had changed significantly since *Roper* was decided. Also in *Miller*, the Court drew a distinction between social science and “science.” *Miller*, 132 S. Ct. at 2464 n.5. Social science, like neuroscience, is science (and arguably more directly relevant to legal criteria for the reasons this Article has discussed). The important distinctions are between good and bad science and legally relevant and legally irrelevant science.

be necessary. Investigators have discovered various small, but statistically significant, differences in neural structure or function between people who are clearly suffering from schizophrenia and those who are not.⁶² Nonetheless in a behaviorally unclear case, the overlap between data on the brains of people with schizophrenia and people without the disorder is so great that a scan is insufficiently sensitive to be used for diagnostic purposes. In short, at present in those cases in which the neuroscience would be most helpful, it has little to contribute. Again, this situation may change if neural markers become more diagnostically sensitive for legally relevant criteria.

Some people think that executive capacity—the congeries of cognitive and emotional capacities that help to plan and regulate human behavior—is going to be the Holy Grail to help the law determine an offender’s true culpability. After all, there is an attractive moral case that people with a substantial lack of these capacities are less culpable, even if their conduct satisfied the *prima facie* case for the crime charged. Perhaps neuroscience can provide specific data previously unavailable to identify executive capacity differences more precisely.

There are two problems, however. First, significant problems with executive capacity are readily apparent without testing, and criminal law simply will not adopt fine-grained culpability criteria. Second, the correlation between neuropsychological tests of executive capacity and actual real world behavior is not terribly strong.⁶³ Only a small fraction of the variance is accounted for, and the scanning studies will use the types of tasks the psychological tests use. Consequently, we are far from able to use neuroscience accurately to assess non-obvious executive-capacity differences that are valid in real world contexts.

VIII. THE RADICAL NEUROCHALLENGE: ARE WE VICTIMS OF NEURONAL CIRCUMSTANCES?

This part addresses the claim and hope raised earlier that neuroscience will cause a paradigm shift in criminal responsibility by demonstrating that we are “merely victims of neuronal circumstances” (or some similar claim that denies human agency). This claim holds that we are not the kinds of intentional creatures we think we are. If our mental states play no role in our behavior and are simply epiphenomenal, then traditional notions of responsibility based on mental states and on actions guided by mental states would be imperiled. But is the rich explanatory apparatus of intentionality simply a post hoc rationalization

62. On the other hand, there may be reason to be cautious about such findings. See generally Ioannidis, *supra* note 55.

63. See, e.g., Russell A. Barkley & Kevin R. Murphy, *Impairment in Occupational Functioning and Adult ADHD: The Predictive Utility of Executive Function (EF) Ratings Versus EF Tests*, 25 ARCHIVES CLINICAL NEUROPSYCHOLOGY 157 (2010).

that the brains of hapless homo sapiens construct to explain what their brains have already done? Will the criminal justice system as we know it wither away as an outmoded relic of a prescientific and cruel age? If so, criminal law is not the only area of law in peril. What will be the fate of contracts, for example, when a biological machine that was formerly called a person claims that it should not be bound because it did not make a contract? The contract is also simply the outcome of various “neuronal circumstances.”

Before continuing, we must understand that the compatibilist metaphysics adopted in Part III does not save agency if the radical claim is true. If determinism is true, two states of the world concerning agency are possible: agency exists or it does not. Compatibilism assumes that agency is true because it holds that agents can be responsible in a determinist universe. It thus essentially begs the question against the radical claim. If the radical claim is true, then compatibilism is false because no responsibility is possible if we are not agents. It is an incoherent notion to have genuine responsibility without agency. The question is whether the radical claim is true.

Given how little we know about the brain-mind and brain-mind-action connections, to claim that we should radically change our conceptions of ourselves and our legal doctrines and practices based on neuroscience is a form of “neuroarrogance.” Although I predict that we will see far more numerous attempts to introduce neuroevidence in the future, I have elsewhere argued that for conceptual and scientific reasons, there is no reason at present to believe that we are not agents.⁶⁴ In particular, I can report that the “Libet industry” that overclaimed about the alleged moral and legal implications of neuroscientist Benjamin Libet’s findings appears to be bankrupt. His work found that there was brain activity in the supplemental motor area prior to awareness of the urge to bodily movements and before movements occurred. This work and the findings of other similar investigations led to the assertion that our brains do all the causal work in explaining behavior. Recent conceptual and empirical work seems to have exploded these claims.⁶⁵ In short, I doubt that this industry will emerge from whatever chapter of the bankruptcy code applies in such cases. It is possible that we are not agents, but the current science does not remotely

64. Morse, *supra* note 6, at 543–54; Stephen J. Morse, *Determinism and the Death of Folk Psychology: Two Challenges to Responsibility from Neuroscience*, 9 MINN. J.L. SCI. & TECH. 1 (2008).

65. See, e.g., ALFRED R. MELE, *EFFECTIVE INTENTIONS: THE POWER OF CONSCIOUS WILL* (2009); ALFRED R. MELE, *FREE: WHY SCIENCE HASN’T DISPROVED FREE WILL* (2014); Moore, *supra* note 7; Parashkev Nachev & Peter Hacker, *The Neural Antecedents to Voluntary Action: Response to Commentaries*, 6 COGNITIVE NEUROSCIENCE 180 (2015); Aaron Schurger et al., *An Accumulator Model for Spontaneous Neural Activity Prior to Self-Initiated Movement*, 109 PROC. NAT’L ACAD. SCI. U.S. E2904, (2012); Aaron Schurger & Sebo Uithol, *Nowhere and Everywhere: The Causal Origin of Voluntary Action*, 2015 REV. PHIL. PSYCH. (ONLINE FIRST ARTICLE) 1, <http://link.springer.com/article/10.1007/s13164-014-0223-2> [<http://perma.cc/7DJL-5BWZ>].

demonstrate that this is true. The burden of persuasion is firmly on the proponents of the radical view.

Most important, the radical view entails no positive agenda. If the truth of pure mechanism is a premise in deciding what to do, no particular moral, legal, or political conclusions follow from it.⁶⁶ The radical view provides no guide as to how one should live or how one should respond to the truth of reductive mechanism. Normativity depends on reason, and thus the radical view is normatively inert. Reasons are mental states. If reasons do not matter, then we have no reason to adopt any particular morals, politics, or legal rules or to do anything at all.

Suppose we are convinced by the mechanistic view that we are not intentional, rational agents after all.⁶⁷ If it is really “true” that we do not have mental states or, slightly more plausibly, that our mental states are epiphenomenal and play no role in the causation of our actions, what should we do now? If it is true, we know that it is an illusion to think that our deliberations and intentions have any causal efficacy in the world. We also know, however, that we experience sensations—such as pleasure and pain—and care about what happens to us and to the world. We cannot just sit quietly and wait for our brains to activate, for determinism to happen. We must, and will, deliberate and act. And if we do not act in accord with the “truth” that the radical view suggests, we cannot be blamed. Our brains made us do it.

Even if we still thought that the radical view was correct and standard notions of genuine moral responsibility and desert were therefore impossible, we might still believe that the law would not necessarily have to give up the concept of incentives. Indeed, Greene and Cohen concede that we would have to keep punishing people for practical purposes.⁶⁸ Such an account would be consistent with “black box” accounts of economic incentives that simply depend on the relation between inputs and outputs without considering the mind as a mediator between the two. For those who believe that a thoroughly naturalized account of human behavior entails complete consequentialism, this conclusion might be welcomed.

66. This line of thought was first suggested by Professor Mitchell Berman in the context of a discussion of determinism and normativity. Mitchell N. Berman, *Punishment and Justification*, 118 ETHICS 258, 271 n.34 (2008).

67. Of course, the notion of being “convinced” would be an illusion, too. Being convinced means that we are persuaded by evidence or argument, but a mechanism is not persuaded by anything. A mechanism is simply neurophysically transformed.

68. Greene & Cohen, *supra* note 3, at 218. The use of the word “punish” is a solecism in their account. Punishment in criminal justice has a constitutive moral meaning associated with guilt and desert. It is not simply a negative reinforcement. They should more properly be talking simply in terms of positive and negative reinforcements.

On the other hand, this view seems to entail the same internal contradiction just explored. What is the nature of the agent that is discovering the laws governing how incentives shape behavior? Could understanding and providing incentives via social norms and legal rules simply be epiphenomenal interpretations of what the brain has already done? How do we decide which behaviors to reinforce positively or negatively? What role does reason—a property of thoughts and agents, not a property of brains—play in this decision?

Given what we know and have reason to do, the allegedly disappearing person remains fully visible and necessarily continues to act for good reasons, including the reasons currently to reject the radical view. We are not Pinocchios, and our brains are not Geppettos pulling the strings. And this is a very good thing. Ultimately, I believe that the vision of the person, of interpersonal relations, and of society the radical view entails bleaches the soul. In the concrete and practical world we live in, we must be guided by our values and a vision of the good life. I do not want to live in the radical's world that is stripped of genuine agency, desert, autonomy, and dignity. For all its imperfections, the criminal law's vision of the person and agency is more respectful and humane.

IX. THE CASE FOR CAUTIOUS NEUROLAW OPTIMISM

Despite having claimed that we should be exceptionally cautious about the current contributions that neuroscience can make to criminal law policy, doctrine, and adjudication, I am modestly optimistic about the near and intermediate term contributions neuroscience can potentially make to our ordinary, traditional, folk-psychological criminal law doctrine and practice. In other words, neuroscience may make a positive contribution even though there has been no paradigm shift in thinking about the nature of the person and the criteria for criminal responsibility. The legal regime to which neuroscience will contribute will continue to take people seriously as people—as autonomous agents who may fairly be blamed and punished based on their mental states and actions.

In general, my hope is that over time there will be feedback between the folk-psychological criteria and the neuroscientific data. Each might inform the other. Conceptual work on mental states might suggest new neuroscientific studies, for example, and the neuroscientific studies might help refine the folk-psychological categories. The ultimate goal would be a reflective, conceptual–empirical equilibrium. At present, I think much of the most promising legally relevant research concerns areas other than criminal justice,⁶⁹ but in what follows I will focus on criminal law.

69. E.g., objective identification of pain, which would transform tort and disability law. See Pustilnik, *supra* note 55.

More specifically, there are four types of situations in which neuroscience may be of assistance: (1) data indicating that the folk-psychological assumption underlying a legal rule is incorrect; (2) data suggesting the need for new or reformed legal doctrine; (3) evidence that helps adjudicate an individual case; and (4) data that help efficient adjudication or administration of criminal justice.

Many criminal law doctrines are based on folk-psychological assumptions about behavior that may prove to be incorrect. If so, the doctrine should change. For example, it is commonly assumed that agents intend the natural and probable consequences of their actions. In many or most cases it seems that they do, but neuroscience may help in the future to demonstrate that this assumption is true far less frequently than we think because, say, more apparent actions are automatic than is currently realized.⁷⁰ In that case, the rebuttable presumption used to help the prosecution prove intent should be softened or used with more caution.

Second, neuroscientific data may suggest the need for new or reformed legal doctrine. For example, control tests for legal insanity have been disfavored for some decades because they are ill understood and hard to assess. It is at present impossible to distinguish “cannot” from “will not,” which is one of the reasons both the American Bar Association and the American Psychiatric Association both recommended abolition of control tests for legal insanity in the wake of the unpopular *Hinckley* verdict.⁷¹ Perhaps neuroscientific information will help to demonstrate and to prove the existence of control difficulties that are independent of cognitive incapacities.⁷² If so, then independent control tests may be justified

70. How successfully such research can be accomplished is difficult to predict, especially if the folk wisdom concerns content rather than functions or capacities. In the example given, a good working definition of automaticity would be necessary, and “experimental” subjects being scanned would have to be reliably in an automatic state. This will be exceedingly difficult research to do. Also, if the real world behavior and the neuroscience seem inconsistent, with rare exception the behavior would have to be considered the accurate measure. Recall the example from Part VII concerning adolescence. If neuroscience were not able to distinguish average adolescent from average adult brains, the sensible conclusions based on common sense and behavioral studies would be that adolescents on average behave less rationally and that the neuroscience is not yet sufficiently advanced to permit identification of neural differences.

71. ABA CRIMINAL JUSTICE MENTAL HEALTH STANDARDS 330, 339-42 (1989); American Psychiatric Association Statement on the Insanity Defense, *reprinted in* 140 AM. J. PSYCHIATRY 681 (1983).

72. See Michael S. Moore, *The Neuroscience of Volitional Excuse*, in LAW AND NEUROSCIENCE: STATE OF THE ART (Dennis Patterson ed., forthcoming 2016). Moore makes the most thorough attempt to date to provide both the folk-psychological mechanism for loss of control and a neuroscientific agenda for studying it. I believe, however, that the mechanism he describes is better understood as a cognitive rationality defect and that such defects are the true source of alleged “loss of control” cases that might warrant mitigation or excuse. I address this claim more fully in Stephen J. Morse, *Moore on the Mind*, in LEGAL, MORAL AND METAPHYSICAL TRUTHS: THE PHILOSOPHY OF MICHAEL S. MOORE (Kimberly K. Ferzan & Stephen J. Morse eds., forthcoming 2016).

and can be rationally assessed after all. More generally, perhaps a larger percentage of offenders than we currently believe have such grave control difficulties that they deserve a generic mitigation claim that is not available in criminal law today.⁷³ Neuroscience might help us discover that fact. If that were true, justice would be served by adopting a generic mitigating doctrine. On the other hand, if it turns out that such difficulties are not so common, we could be more confident of the justice of current doctrine.

Third, neuroscience might provide data to help adjudicate individual cases. Consider the insanity defense again. As in *United States v. Hinckley*,⁷⁴ there is often dispute about whether a defendant claiming legal insanity suffered from a mental disorder, which disorder the defendant suffered from, or how severe the disorder was.⁷⁵ At present, these questions must be resolved entirely behaviorally, and there is often room for considerable disagreement about inferences drawn from the defendant's actions, including utterances. In the future, neuroscience might help resolve such questions if the clear-cut problem difficulty can be solved. In the foreseeable future, I doubt that neuroscience will be able to help identify the presence or absence of specific mens rea because mind reading seems nearly impossible, but we may be able to identify brain states that suggest that a subject is lying or is familiar with a place he denies recognizing.⁷⁶

Finally, neuroscience might help us to implement current policy more efficiently. For example, the criminal justice system makes predictions about future dangerous behavior for purposes of bail, sentencing (including capital sentencing), and parole. If we have already decided that it is justified to use dangerousness predictions to make such decisions, it is hard to imagine a rational argument for doing it less accurately if we are in fact able to do it more accurately.⁷⁷ Behavioral prediction techniques already exist. The question is whether neuroscientific variables can add value by increasing the accuracy of such predictions considering the cost of gathering such data. Very recently, two

73. I have proposed a generic mitigating condition that would address both cognitive and control incapacities short of those warranting a full excuse. Stephen J. Morse, *Diminished Rationality, Diminished Responsibility*, 1 OHIO ST. J. CRIM. L. 289 (2003).

74. 525 F. Supp. 1342 (D.D.C. 1981).

75. *Id.* at 1346.

76. Henry T. Greely, *Mind Reading, Neuroscience, and the Law*, in A PRIMER ON CRIMINAL LAW AND NEUROSCIENCE, *supra* note 46, at 120. This is known as "brain reading" because it identifies neural correlates of a mental process rather than the subject's specific mental content. The latter would be "mind reading." For example, particular brain activation might reliably indicate whether the subject was adding or subtracting, but it could not show what specific numbers were being added or subtracted. John-Dylan Haynes et al., *Reading Hidden Intentions in the Human Brain*, 17 CURRENT BIOLOGY 323 (2007).

77. 2 PRESIDENTIAL COMM'N FOR THE STUDY OF BIOETHICAL ISSUES, GRAY MATTERS: TOPICS AT THE INTERSECTION OF NEUROSCIENCE, ETHICS, AND SOCIETY 98 (2015) (approvingly quoting this position of mine).

studies have been published showing the potential usefulness of neural markers for enhancing the accuracy of predictions of antisocial conduct.⁷⁸ Although these must be considered preliminary, “proof of concept” studies,⁷⁹ it is perfectly plausible that in the future genuinely valid, cost–benefit, justified neural markers will be identified and, thus, prediction decisions will be more accurate and just.

X. CONCLUSION

At present, neuroscience has little to contribute to more just and accurate criminal law policy, doctrine, and individual case adjudication. This was the conclusion reached when I tentatively identified “Brain Overclaim Syndrome” nine years ago, and it remains true today. In the future, however, as the philosophies of mind and action and neuroscience mutually mature and inform one another, neuroscience will help us understand criminal behavior. Although no radical transformation of criminal justice is likely to occur, neuroscience can inform criminal justice as long as it is relevant to law and translated into the law’s folk-psychological framework and criteria. The home remedies are working, and please don’t wake me until the doctor comes. As Jerry Fodor counseled, “[E]verything is going to be all right.”⁸⁰

78. Eyal Aharoni et al., *Neuroprediction of Future Rearrest*, 110 PROC. NAT’L ACAD. SCI. U.S. 6223 (2013); Dustin A. Pardini et al., *Lower Amygdala Volume in Men Is Associated with Childhood Aggression, Early Psychopathic Traits, and Future Violence*, 75 BIOLOGICAL PSYCHIATRY 73 (2014).

79. For example, a re-analysis of the Aharoni study by Russell Poldrack, a noted “neuromethodologist,” demonstrated that the effect size was tiny. Russell Poldrack, *How Well Can We Predict Future Criminal Acts from fMRI Data?*, RUSSPOLDRACK.ORG (Apr. 6, 2013), <http://www.russpoldrack.org/search?q=aharoni> [<http://perma.cc/X5TP-LGZ8>]. Also, the study used good, but not the best, behavioral predictive methods for comparison.

80. FODOR, *supra* note 5, at xii.